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EXAMINER	
DAY, HERNG DER	

ART UNIT	PAPER NUMBER
2128	

DATE MAILED: 02/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/025,964	SCHLESSINGER ET AL.	
	Examiner	Art Unit	
	Herng-der Day	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 December 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-97* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-97* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 December 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/19/01, 6/27/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-97 have been examined and claims 1-97 have been rejected.

Drawings

2. The drawings are objected to for the following reasons. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the Examiner, the Applicants will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2-1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "20" has been used to designate both "block 20" in Figure 1 and "sample space 20" in Figure 2.

2-2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign mentioned in the description:

(a) block 120, as described in line 13 of paragraph [00012].

Specification

3. The disclosure is objected to because of the following informalities:

Appropriate correction is required.

3-1. It appears that "represented with angle brackets throughout the disclosure Thus,", as described in lines 5-6 of paragraph [00050], should be "represented with angle brackets throughout the disclosure. Thus,".

3-2. It appears that "where $\lambda = 3513$. As shown in FIG. 9B, The distribution for s_1", as described in line 4 of paragraph [00080], should be "where $\lambda = 3513$, as shown in FIG. 9C. The distribution for s_1".

3-3. It appears that "As shown in the flow diagram of FIG.1", as described in lines 4-5 of paragraph [00086], should be "As shown in the flow diagram of FIG. 11".

3-4. It appears that "the exact model depend on he intervention", as described in line 3 of paragraph [00099], should be "the exact model depend on the intervention".

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-97 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

5-1. All the independent claims recite the limitation, "deriving a corresponding distribution function" or "derive a corresponding distribution function". Applicants provide an "Example 1" to illustrate the workings. As described in paragraph [00048], there are 123 individuals or values of k in the sample of Example 1 and the samples of the distribution for each of the seven f_j are shown histogrammatically in each of FIGS. 3-9A. However, the total "Number in Bin" in each of FIGS. 3-9A is greater than 123. Therefore, without undue experimentation, it is unclear for one skilled in the art how to derive a corresponding distribution function based on the teachings of the "Example 1" as disclosed in paragraph [00048] and shown in each of FIGS. 3-9A.

5-2. Independent claims 10 recites the limitation, "mathematically expanding each member of said sample data set in the form of a summation of results of multiplying each said expansion function in said set of expansion functions by a plurality of different mathematical parameters" and each of the independent claims 21, 41, 52, 74, and 85 recites an equivalent limitation. However, "multiplying each said expansion function by a plurality of different mathematical parameters" has not been disclosed in the specification. As described in paragraph [00032], the mathematical expansion has the form of Eq. (2) wherein each basis function is multiplied by a coefficient $f_j(\omega)$. Therefore, without undue experimentation, it is unclear for one skilled in the art how to properly generate a plurality of different mathematical parameters for each expansion function to multiply.

5-3. Claims not specifically rejected above are rejected as being dependent on a rejected claim.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 11, 12, 18-31, 37, 38, 40, 42, 43, 46, 49-64, 70, 71, 73, 75, 76, 79, 80, and 82-97 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7-1. Claim 11 recites the limitation "said generated probability distribution" in lines 5-6 of the claim. There is insufficient antecedent basis for this limitation in the claim.

7-2. Claim 18 recites the limitation "said data set" in line 9 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said data set" as described in line 9 refers to "said sample data set".

7-3. Claim 21 recites the limitation "said data set" in line 9 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said data set" as described in line 9 refers to "said sample data set".

7-4. Claim 22 recites the limitation "said selected parameters" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim.

7-5. Claim 22 recites the limitation "said generated probability distribution" in line 6 of the claim. There is insufficient antecedent basis for this limitation in the claim.

7-6. Claim 26 recites the limitation "said continuous mathematical model" in line 2 of the claim. It is vague and indefinite regarding "said continuous mathematical model" because two different continuous mathematical models have been generated in line 13 and in line 16 of claim 21 respectively. For the purpose of claim examination, the Examiner will presume that "said continuous mathematical model" refers to the "continuous mathematical model" recited in line 16 of claim 21.

7-7. Claim 30 recites the limitation "said parameters" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said parameters" as described in line 2 refers to "said mathematical parameters".

7-8. Claim 31 recites the limitation "said continuous mathematical model" in line 2 of the claim. It is vague and indefinite regarding "said continuous mathematical model" because two different continuous mathematical models have been generated in line 13 and in line 16 of claim 18 respectively. For the purpose of claim examination, the Examiner will presume that "said continuous mathematical model" refers to the "continuous mathematical model" recited in line 16 of claim 18.

7-9. Claim 37 recites the limitation "said Fourier function" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said Fourier function" as described in line 2 refers to "said Fourier expanding function".

7-10. Claim 38 recites the limitation "said parameters" in line 1 and line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said parameters" as described in line 1 and line 2 refers to "said mathematical parameters".

7-11. Claim 42 recites the limitation "said generated probability distribution" in line 6 of the claim. There is insufficient antecedent basis for this limitation in the claim.

7-12. Claim 46 recites the limitation "said Fourier function" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim

examination, the Examiner will presume that "said Fourier function" as described in line 2 refers to "said Fourier expanding function".

7-13. Claim 49 recites the limitation "said data set" in line 9 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said data set" as described in line 9 refers to "said sample data set".

7-14. Claim 52 recites the limitation "said data set" in line 9 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said data set" as described in line 9 refers to "said sample data set".

7-15. Claim 53 recites the limitation "said selected parameters" in lines 2-3 of the claim. There is insufficient antecedent basis for this limitation in the claim.

7-16. Claim 53 recites the limitation "said generated probability distribution" in line 6 of the claim. There is insufficient antecedent basis for this limitation in the claim.

7-17. Claim 57 recites the limitation "said Fourier function" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said Fourier function" as described in line 2 refers to "said Fourier expanding function".

7-18. Claim 58 recites the limitation "said parameters" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said parameters" as described in line 2 refers to "said mathematical parameters".

7-19. Claim 59 recites the limitation "said continuous mathematical model" in lines 2-3 of the claim. It is vague and indefinite regarding "said continuous mathematical model" because two

different continuous mathematical models have been generated in line 14 and in line 17 of claim 52 respectively. For the purpose of claim examination, the Examiner will presume that "said continuous mathematical model" refers to the "continuous mathematical model" recited in line 17 of claim 52.

7-20. Claim 62 recites the limitation "said Fourier function" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said Fourier function" as described in line 2 refers to "said Fourier expanding function".

7-21. Claim 63 recites the limitation "said parameters" in line 1 and line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said parameters" as described in line 1 and line 2 refers to "said mathematical parameters".

7-22. Claim 64 recites the limitation "said continuous mathematical model" in line 2 of the claim. It is vague and indefinite regarding "said continuous mathematical model" because two different continuous mathematical models have been generated in line 13 and in line 17 of claim 49 respectively. For the purpose of claim examination, the Examiner will presume that "said continuous mathematical model" refers to the "continuous mathematical model" recited in line 17 of claim 49.

7-23. Claim 70 recites the limitation "said Fourier function" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said Fourier function" as described in line 2 refers to "said Fourier expanding function".

7-24. Claim 71 recites the limitation "said parameters" in line 1 and line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said parameters" as described in line 1 and line 2 refers to "said mathematical parameters".

7-25. Claim 75 recites the limitation "said generated probability distribution" in line 7 of the claim. There is insufficient antecedent basis for this limitation in the claim.

7-26. Claim 79 recites the limitation "said parameters" in line 1 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said parameters" as described in line 1 refers to "said mathematical parameters".

7-27. Claim 79 recites the limitation "said Fourier function" in lines 1-2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said Fourier function" as described in lines 1-2 refers to "said Fourier expanding function".

7-28. Claim 80 recites the limitation "said parameters" in line 1 and line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said parameters" as described in line 1 and line 2 refers to "said mathematical parameters".

7-29. Claim 82 recites the limitation "said data set" in line 10 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said data set" as described in line 10 refers to "said sample data set".

7-30. Claim 85 recites the limitation "said data set" in line 10 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said data set" as described in line 10 refers to "said sample data set".

7-31. Claim 86 recites the limitation "said selected parameters" in lines 2-3 of the claim. There is insufficient antecedent basis for this limitation in the claim.

7-32. Claim 86 recites the limitation "said generated probability distribution" in line 7 of the claim. There is insufficient antecedent basis for this limitation in the claim.

7-33. Claim 90 recites the limitation "said parameters" in line 1 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said parameters" as described in line 1 refers to "said mathematical parameters".

7-34. Claim 90 recites the limitation "said Fourier function" in lines 1-2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said Fourier function" as described in lines 1-2 refers to "said Fourier expanding function".

7-35. Claim 91 recites the limitation "said parameters" in line 1 and line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said parameters" as described in line 1 and line 2 refers to "said mathematical parameters".

7-36. Claim 92 recites the limitation "said continuous mathematical model" in lines 2-3 of the claim. It is vague and indefinite regarding "said continuous mathematical model" because two

different continuous mathematical models have been generated in line 15 and in line 20 of claim 85 respectively. For the purpose of claim examination, the Examiner will presume that "said continuous mathematical model" refers to the "continuous mathematical model" recited in line 20 of claim 85.

7-37. Claim 95 recites the limitation "said parameters" in line 1 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said parameters" as described in line 1 refers to "said mathematical parameters".

7-38. Claim 95 recites the limitation "said Fourier function" in lines 1-2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said Fourier function" as described in lines 1-2 refers to "said Fourier expanding function".

7-39. Claim 96 recites the limitation "said parameters" in line 1 and line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that "said parameters" as described in line 1 and line 2 refers to "said mathematical parameters".

7-40. Claim 97 recites the limitation "said continuous mathematical model" in lines 2-3 of the claim. It is vague and indefinite regarding "said continuous mathematical model" because two different continuous mathematical models have been generated in line 15 and in line 20 of claim 82 respectively. For the purpose of claim examination, the Examiner will presume that "said continuous mathematical model" refers to the "continuous mathematical model" recited in line 20 of claim 82.

7-41. Claims not specifically rejected above are rejected as being dependent on a rejected claim.

Claim Rejections - 35 USC § 101

8. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

9. Claims 1-97 are rejected under 35 U.S.C. 101 because the inventions as disclosed in claims are directed to non-statutory subject matter.

9-1. Claims 1-31 are not tangibly embodied because they could be practiced with pencil and paper and because it appears to be directed to the manipulation of abstract ideas of generating a continuous mathematical model. In other words, it is not in the technology arts and the claimed invention does not recite a concrete, useful, and tangible result.

9-2. Claims 32-64 are system claims and recite means-plus-function limitation. Claims 65-97 are system claims and recite subsystem limitation. As described in paragraph [000101], "the invention may be implemented using object-oriented programming with the major classes of objects in the model to include subjects such as members, patients, facilities, personnel, interventions, equipment, supplies, records, policies, and budgets. Those of ordinary skill in the art will now realize that the invention may also be implemented using any appropriate programming techniques". Therefore, the precise structure of the means for and the subsystem performing the recited function is software programming per se. In other words, the claimed invention taken as a whole is directed to a mere program listing and hence nonstatutory. See MPEP §2106 (IV) (B).

9-3. The Examiner acknowledges that even though the claims are presently considered non-statutory they are additionally rejected below over the prior art. The Examiner assumes the Applicants will amend the claims to overcome the 101 rejections and thus make the claims statutory.

Claim Interpretation

10. Independent claims 10, 21, 41, 52, 74, and 85 recite the limitation "by a plurality of different mathematical parameters" in each claim. However, multiplying each said expansion function "by a plurality of different mathematical parameters" has not been disclosed in the specification as discussed in section **5-2** above. For the purpose of claim examination with the broadest reasonable interpretation, the Examiner will interpret "by a plurality of different mathematical parameters" as "by a different mathematical parameter" through summing up the plurality of different mathematical parameters and representing the result by one mathematical parameter only.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1-2, 6-13, 15-18, 21-24, 26-27, 29-33, 37-44, 46-49, 52-55, 57-60, 62-66, 70-77, 79-82, 85-88, 90-93, and 95-97, are rejected under 35 U.S.C. 102(b) as being anticipated by

Newman, "Model Reduction via the Karhunen-Loeve Expansion Part I: An Exposition", Institute for Systems Research and Electrical Engineering Department, University of Maryland, April 1996, pages 1-19, (IDS A, June 27, 2003).

12-1. Regarding claim 1, Newman discloses a method for generating a continuous mathematical model of a feature common to subjects in a subject group, said method comprising:

selecting a sample data set from each subject in the subject group (sample the empirical flow data, page 14, section 3.5);

selecting a set of expansion functions to be used in the representation of the sample data set (an orthonormal basis $\{\phi_1, \phi_2, \ldots\}$, page 8, paragraph 3);

mathematically expanding each member of said sample data set in the form of a summation of results of multiplying each said expansion function in said set of expansion functions by a different mathematical parameter wherein said expanding determines a value for each of said different mathematical parameters (result in an expansion of the flow into a sum of products, page 8, paragraph 4);

deriving a corresponding distribution function for each of said mathematical parameters (the Fourier coefficients are time-dependent random variables, page 8, paragraph 3); and

generating the continuous mathematical model of the feature from said derived distribution functions and said expansion functions ($v(t, x)$, page 8, paragraph 3).

12-2. Regarding claim 2, Newman further discloses said mathematically expanding is accomplished using a Fourier expanding function (Fourier coefficients, page 8, paragraph 3).

12-3. Regarding claim 6, Newman further discloses said mathematical parameters are coefficients of said Fourier expanding function (Fourier coefficients, page 8, paragraph 3).

12-4. Regarding claim 7, Newman further discloses said determined value of said parameters is an estimated value of said parameters ($\sum$ of n instead of ∞, page 8, paragraph 3).

12-5. Regarding claim 8, Newman further discloses comprising:

generating a simulated subject from said continuous mathematical model (flow $v(t, \bullet)$, page 8, paragraph 2).

12-6. Regarding claim 9, Newman further discloses each expansion function is a deterministic function of age of each subject (the orthonormal basis consists of completely deterministic $\pounds_2$-functions, page 8, paragraph 3).

12-7. Regarding claim 10, Newman discloses a method for generating a continuous mathematical model of a feature common to subjects in a subject group, said method comprising:

selecting a sample data set from each subject in the subject group (sample the empirical flow data, page 14, section 3.5);

selecting a set of expansion functions to be used in the representation of the sample data set (an orthonormal basis $\{\phi_1, \phi_2, \ldots\}$, page 8, paragraph 3);

mathematically expanding each member of said sample data set in the form of a summation of results of multiplying each said expansion function in said set of expansion functions by a [plurality of] different mathematical parameter[s] wherein said expanding determines a value for each of said plurality of mathematical parameters (result in an expansion of the flow into a sum of products, page 8, paragraph 4);

deriving a corresponding distribution function for each of said plurality of mathematical parameters (the Fourier coefficients are time-dependent random variables, page 8, paragraph 3); and

generating the continuous mathematical model of the feature based on said derived distribution functions and said expansion functions ($v(t, x)$, page 8, paragraph 3).

12-8. Regarding claims 11-12, Newman further discloses comprising:

determining existence of dependency correlations between said mathematical parameters in said plurality of mathematical parameters; and decorrelating said determined correlated mathematical parameters, wherein said generating the continuous mathematical model of the feature is also based on said generated probability distribution and said decorrelating, wherein said dependency correlations are first order dependency correlations (the K-L expansion provides a method for constructing the uncorrelated set of random variables, page 9, section 3.3, paragraph 1).

12-9. Regarding claim 13, Newman further discloses said mathematically expanding is accomplished using a Fourier expanding function (Fourier coefficients, page 8, paragraph 3).

12-10. Regarding claim 15, Newman further discloses said mathematical parameters are coefficients of said Fourier expanding function (Fourier coefficients, page 8, paragraph 3).

12-11. Regarding claim 16, Newman further discloses said determined value of said mathematical parameters is an estimated value of said mathematical parameters ($\sum$ of n instead of ∞, page 8, paragraph 3).

12-12. Regarding claim 17, Newman further discloses comprising:

generating a simulated subject from said continuous mathematical model (flow $v(t, \bullet)$, page 8, paragraph 2).

12-13. Regarding claim 18, Newman discloses a method for generating a continuous mathematical model of a plurality of features common to subjects in a subject group, said method comprising:

selecting a plurality of sample data sets from each subject in the subject group wherein each said sample data set is of a different feature in the plurality of features (sample the empirical flow data, page 14, section 3.5);

selecting a set of expansion functions to be used in the representation of each of the sample data sets (an orthonormal basis $\{\phi_1, \phi_2, \ldots\}$, page 8, paragraph 3);

mathematically expanding each member of each said sample data set in the form of a summation of results of multiplying each said expansion function in said set of expansion functions of said data set by a different mathematical parameter wherein said expanding determines a value for each of said different mathematical parameters (result in an expansion of the flow into a sum of products, page 8, paragraph 4);

deriving a corresponding distribution function for each of said mathematical parameters (the Fourier coefficients are time-dependent random variables, page 8, paragraph 3);

generating a continuous mathematical model for each said feature from said derived distribution functions and said expansion functions of said feature ($v(t, x)$, page 8, paragraph 3);

correlating said generated mathematical models for each said features (correlation function, page 4, paragraph 1); and

generating the continuous mathematical model of the plurality of features based on said deriving and said correlating ($v(t, x)$, page 8, paragraph 3).

12-14. Regarding claim 21, Newman discloses a method for generating a continuous mathematical model of a plurality of features common to subjects in a subject group, said method comprising:

selecting a plurality of sample data sets from each subject in the subject group wherein each said sample data set is of a different feature in the plurality of features (sample the empirical flow data, page 14, section 3.5);

selecting a set of expansion functions to be used in the representation of each of the sample data sets (an orthonormal basis $\{\phi_1, \phi_2, \ldots\}$, page 8, paragraph 3);

mathematically expanding each member of each said sample data set in the form of a summation of results of multiplying each said expansion function in said set of expansion functions of said data set by a [plurality of] different mathematical parameter[s] wherein said expanding determines a value for each of said plurality of mathematical parameters (result in an expansion of the flow into a sum of products, page 8, paragraph 4);

deriving a corresponding distribution function for each of said mathematical parameters (the Fourier coefficients are time-dependent random variables, page 8, paragraph 3);

generating a continuous mathematical model for each said feature from based on said derived distribution functions and said expansion functions of said feature ($v(t, x)$, page 8, paragraph 3);

correlating said generated mathematical models of said features (correlation function, page 4, paragraph 1); and

generating the continuous mathematical model of the plurality of features based on said correlating ($v(t, x)$, page 8, paragraph 3).

12-15. Regarding claim 22-23, Newman further discloses comprising:

determining existence of dependency correlations between said selected parameters in said plurality of mathematical parameters; and decorrelating said correlated selected parameters based on said determining, wherein said generating said continuous mathematical model for each said feature is also based on said generated probability distribution and said decorrelating, wherein said dependency correlations are first order dependency correlations (the K-L expansion provides a method for constructing the uncorrelated set of random variables, page 9, section 3.3, paragraph 1).

12-16. Regarding claim 24, Newman further discloses said mathematically expanding is accomplished using a Fourier expanding function and wherein said mathematical parameters are coefficients of said Fourier expanding function (Fourier coefficients, page 8, paragraph 3).

12-17. Regarding claim 26, Newman further discloses comprising:

generating a simulated subject from said continuous mathematical model (flow $v(t,\bullet)$, page 8, paragraph 2).

12-18. Regarding claim 27, Newman further discloses said mathematically expanding is accomplished using a Fourier expanding function (Fourier coefficients, page 8, paragraph 3).

12-19. Regarding claim 29, Newman further discloses said mathematical parameters are coefficients of said Fourier expanding function (Fourier coefficients, page 8, paragraph 3).

12-20. Regarding claim 30, Newman further discloses said determined value of said mathematical parameters is an estimated value of said parameters ($\sum$ of n instead of ∞, page 8, paragraph 3).

12-21. Regarding claim 31, Newman further discloses comprising:

generating a simulated subject from said continuous mathematical model (flow $v(t,\bullet)$, page 8, paragraph 2).

12-22. Regarding claims 32-33, 37-44, 46-49, 52-54, 59-60, and 62-64, these system claims include equivalent method limitations as in claims 1-2, 6-13, 15-18, 21-23, 26-27, and 29-31 and are anticipated using the same analysis of claims 1-2, 6-13, 15-18, 21-23, 26-27, and 29-31.

12-23. Regarding claim 55, Newman further discloses said means for mathematically expanding utilizes a Fourier expanding function (Fourier coefficients, page 8, paragraph 3).

12-24. Regarding claim 57, Newman further discloses said mathematical parameters are coefficients of said Fourier expanding function (Fourier coefficients, page 8, paragraph 3).

12-25. Regarding claim 58, Newman further discloses said determined value of said mathematical parameters is an estimated value of said mathematical parameters ($\sum$ of n instead of ∞, page 8, paragraph 3).

12-26. Regarding claims 65-66, 70-77, 79-82, 85-87, 92-93, and 95-97, these system claims include equivalent method limitations as in claims 1-2, 6-13, 15-18, 21-23, 26-27, and 29-31 and are anticipated using the same analysis of claims 1-2, 6-13, 15-18, 21-23, 26-27, and 29-31.

12-27. Regarding claim 88, Newman further discloses said mathematical expansion subsystem is adapted to perform a Fourier expanding function (Fourier coefficients, page 8, paragraph 3).

12-28. Regarding claim 90, Newman further discloses said mathematical parameters are coefficients of said Fourier expanding function (Fourier coefficients, page 8, paragraph 3).

12-29. Regarding claim 91, Newman further discloses said determined value of said mathematical parameters is an estimated value of said mathematical parameters ($\sum$ of n instead of ∞, page 8, paragraph 3).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claims 3-5, 14, 19-20, 25, 28, 34-36, 45, 50-51, 56, 61, 67-69, 78, 83-84, 89, and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Newman, "Model Reduction via the Karhunen-Loeve Expansion Part I: An Exposition", Institute for Systems Research and Electrical Engineering Department, University of Maryland, April 1996, pages 1-19, (IDS A, June 27, 2003), in view of Brown, U.S. Patent 5,956,501 issued September 21, 1999, (IDS C, December 19, 2001).

14-1. Regarding claims 3-5, 14, 19-20, 25, and 28, Newman fails to expressly disclose (1) using a Hybrid expanding function; (2) said feature is a physiological condition affecting said subject group; and (3) said physiological condition is a disease.

Brown discloses a disease simulation system for predicting the effect of patient self-care actions on the disease control parameter. The future disease control parameter value is calculated according to the equation shown in column 2, lines 49, including the item of the summation of the patient self-care values multiplied by corresponding scaling factors, i.e., Hybrid expansion. Because Brown's disease simulation system is sufficiently general and accurate it may be used to simulate many different types of diseases and may also be easily customized to an individual patient (column 2, lines 17-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Newman to incorporate the teachings of Brown to obtain the invention as specified in claims 3-5, 14, 19-20, 25, and 28, because using Brown's disease simulation system is sufficiently accurate and flexible without the need to write new model.

14-2. Regarding claims 34-36, 45, 50-51, 56, and 61, these system claims include equivalent method limitations as in claims 3-5, 14, 19-20, 25, and 28, and are unpatentable using the same analysis of claims 3-5, 14, 19-20, 25, and 28.

14-3. Regarding claims 67-69, 78, 83-84, 89, and 94, these system claims include equivalent method limitations as in claims 3-5, 14, 19-20, 25, and 28, and are unpatentable using the same analysis of claims 3-5, 14, 19-20, 25, and 28.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to Applicants' disclosure. Reference to Savic, U.S. Patent 5,327,893 issued July 12, 1994, is cited as disclosing a method of diagnosing arterial stenosis.

Reference to Agrawal et al., U.S. Patent 6,003,029 issued December 14, 1999, is cited as disclosing a method for finding clusters.

Reference to Goldman et al., U.S. Patent 6,766,283 issued July 20, 2004, and filed October 13, 2000, is cited as disclosing a method of modeling a monitorable stage in a process.

16. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Herng-der Day whose telephone number is (571) 272-3777. The Examiner can normally be reached on 9:00 - 17:30.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Jean R. Homere can be reached on (571) 272-3780. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Herng-der Day H.D.
February 22, 2005

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